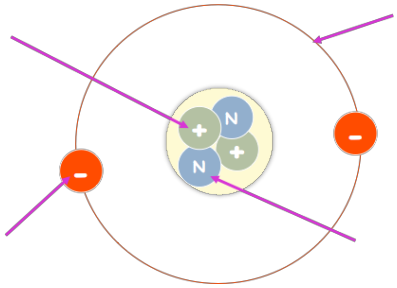
Name: _____ Per: _____

The Atom and its History Guided Notes

I. What is an Atom ?!



It is comprised of :

subatomic particle	abbreviated	charge	relative mass	location

II. Timeline of the Atom

A. 460 BC Democritus develops _____

1. He pounded up materials until he reduced them to smaller and smaller particles which he called _____.
   a) The Greek word atomas means unable to be _____ or _____; indivisible.
2. Democritus' idea were not "useful" because
   a)
   b)

B. 1808 John Dalton – English school teacher

1. Suggested that all matter was made up of tiny _____ that were able to bounce around with perfect elasticity and called them _____.
2. Atoms cannot be divided into smaller parts, created or destroyed.
3. Atoms of a given element are _____ _____ and atoms of different elements could join to form _____.
4. *Law of Definite Proportions* – chemical compounds always contain the _____ elements in the exact same proportions by _____ or _____
5. In chemical reactions, atoms are combined separated or rearranged.

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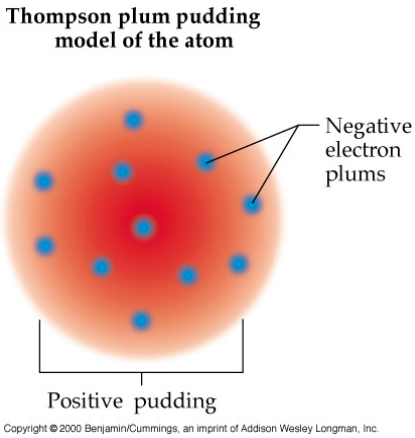
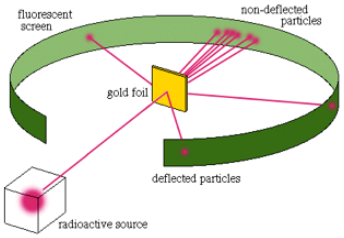
C. 1898 J. J. Thompson – British scientist

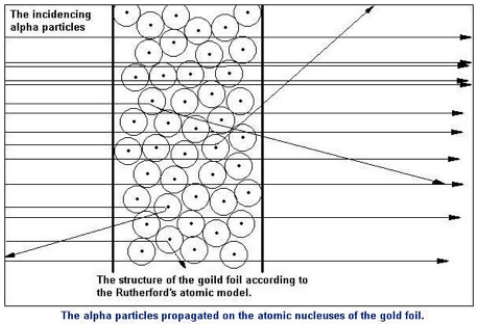
1. Found that atoms could sometimes eject a far _____ _____ particle which he called an _____
2. His experiment revealed that _____ could be _____ into smaller parts
3. 1904 - Thompson develops the idea that an atom was made up of electrons scattered unevenly within an elastic sphere surrounded by a soup of positive charge to balance the electron's charge like plums surrounded by pudding.



D. 1910 ****Ernest Rutherford****

1. Tested Thomson's plum pudding model with the: _____
   a) fired Helium nuclei (alpha particles) at a piece of gold foil which was only a few atoms thick.
      (1) found that although most alpha particles passed through foil, about 1 in 10,000 hit and _____

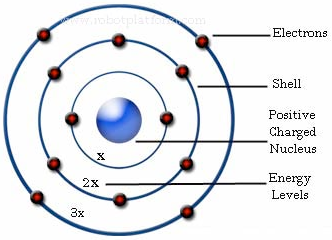




   b) Rutherford's proposed a more detailed model with a **central nucleus**.
      1. positive charge and mass of the atom was all in a _____ nucleus.
      2. Electrons held in place around the nucleus by _____ attraction. He did not know how the electrons were arranged though.

E. 1913 Niels Bohr – studied under Rutherford

1. Bohr refined Rutherford's idea by adding that the electrons were in _____.
   a) Like _____ orbiting the sun.
   b) Each orbit only able to contain a **set number of** _____



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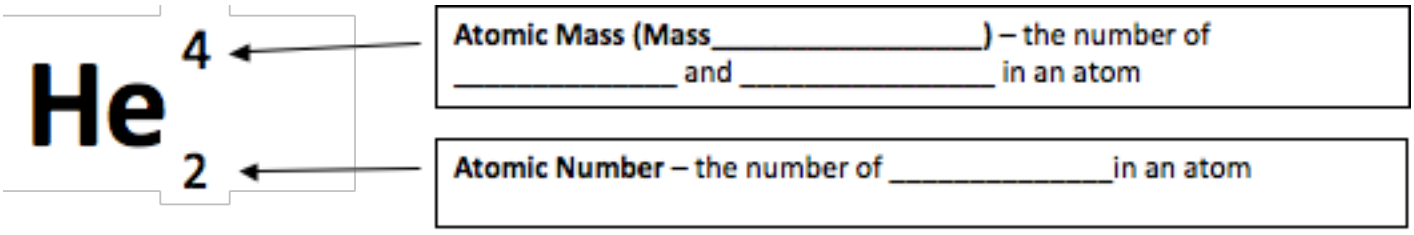
III. Expressing information about a atom using the periodic table

Atomic Shorthand / isotope notation



*In a neutral Atom, the number of _____ = the number of _____

WE WILL ASSUME EVERY ATOM IS NEUTRAL UNLESS OTHERWISE INDICATED

PRACTICE

Determine the number of protons, neutrons and electrons in each stable atom

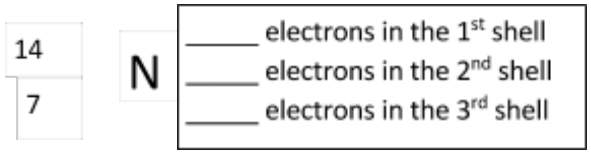
$^{40}_{20}Ca$	$^{23}_{11}Na$	$^{16}_{8}O$	$^{35}_{17}Cl$	$^{28}_{14}Si$	$^{11}_{5}B$
P=	P=	P=	P=	P=	P=
e-=	e-=	e-=	e-=	e-=	e-=
N=	N=	N=	N=	N=	N=

Electrons Shells: or Energy Levels determine how _____ are arranged around the _____

1. Electrons fills inner/lower shells _____, then outer/higher shells
   a. first shell - a maximum of ____ electrons
   b. second shell - a maximum of ____ electrons
   c. third shell - a maximum of ____ electrons

C. There are two ways to represent the atomic structure of an element or compound
   1. Electron Configuration - With electronic configuration elements are represented _____ by the number of_____ in their shells and number of shells.

For example: Nitrogen –> 2, 5



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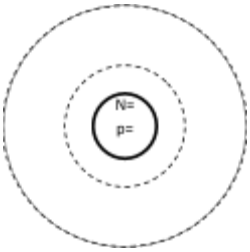
PRACTICE

Write the configuration for the following elements:

Ca	Na	O
Electron configuration_____	Electron Configuration_____	Electron configuration_____
Cl	Si	B
Electron configuration_____	Electron Configuration_____	Electron configuration_____

D. Bohr Model

- Bohr model shows _____ represented by dots to show _____, and large circles to show the _____. For example Nitrogen would be drawn like this:



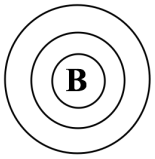
Draw the Bohr model for:

Oxygen **Chlorine**

E. Valence Electrons: Electrons in the _____ most shell

1. Determines how atoms react with other atoms

F. Lewis Dot Model: showing an atom using only the valence electrons.

BOHR MODEL DIAGRAM	LEWIS DOT STRUCTURE	BOHR MODEL DIAGRAM	LEWIS DOT STRUCTURE	BOHR MODEL DIAGRAM	LEWIS DOT STRUCTURE
	**H**		**He**		**B**

G. _____: Atoms of the same type with the _____ number of protons but _____ number of neutrons.

H. _____: Atoms that carry a charge due to the gain or loss of electrons

I. _____: Particles that make up protons and neutrons